Trek Model 30/20A

High-Voltage Power Amplifier

The Model 30/20A is a DC-stable, high-voltage power amplifier featuring an all solid-state design for high slew rate, wide bandwidth, and low-noise operation. t is configured as noninverting with a fixed gain of 3000 V/V and is protected against overvoltage and overcurrent conditions that may be generated by active loads or by output short circuits to ground. Precision voltage and current monitors provide low-voltage representations of the high-voltage output and load current for monitoring purposes or for use as feedback signals in a closed-loop system.

The 4-quadrant, active output stage sinks or sources current to reactive or resistive loads throughout the output voltage range. This is essential to achieve the accurate output response and high slew rates demanded by reactive loads.

Key Specifications

- Output Voltage Range: 0 to ±30 kV DC or peak AC
- Output Current Range: 0 to ±20 mA DC or peak AC
- Slew Rate: Greater than 550 V/µs
- Large Signal Bandwidth (2% distortion): DC to greater than 2.5 kHz
- DC Voltage Gain: 3000 V/V

Typical Applications Include

- Dielectric studies
- Electron beam ion traps and ion sourcing
- Electrospinning
- Electrostatic deflection (including ion beam steering)
- Electrostatic flame control
- Electrostatic levitation
- Electrostatic precipitation
- High-voltage cable testing
- High-voltage component testing
- Plasma studies (including dielectric barrier discharge)

Features and Benefits

- Four-quadrant output for driving capacitive loads
- Closed loop system for high accuracy
- Short-circuit protected for equipment protection
- All solid-state design for maintenance free operation
- DC-stable for programmable supply applications
- Low output noise for ultra-accurate outputs
- NIST-traceable Certificate of Calibration provided with each unit
- CE compliant

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Model 30/20A Specifications

Performance

Output Voltage Range	0 to ±30 kV DC or peak AC
Output Current Range	0 to ±20 mA DC or peak AC
Input Voltage Range	0 to ±10 V DC or peak AC
Input Impedance	25 kΩ nominal (inverting/differential option 50 kΩ, nominal)
DC Voltage Gain	3000 V/V
DC Voltage Gain Accuracy	Better than 0.1% of full scale
Offset Voltage	Less than ±4 V
Output Noise	Less than 1.5 V rms*
Slew Rate (10% to 90%, typical)	Greater than 550 V/µs
Small Signal Bandwidth (-3dB)	DC to greater than 30 kHz
Large Signal Bandwidth (2% distortion)	DC to greater than 2.5 kHz
Stability	
Drift with Time	Less than 50 ppm/hr, noncumulative
Drift with Temperature	Less than 100 ppm/°C

Voltage Monitor

Ratio	1 V / 3000 V
DC Accuracy	Better than 0.1% of full scale
DC Offset Voltage	Less than ±5 mV
Output Noise	Less than 20 mV rms*
Output Impedance	47 Ω

Current Monitor

Ratio	0.5 V/mA
DC Accuracy	Better than 2% of full scale
Offset Voltage	Less than ±10 mV
Output Noise	Less than 30 mV rms*
Bandwidth (-3dB)	DC to greater than 5 kHz
Output Impedance	47 Ω

Features

Settling Time (to 1%)	Less than 200 µs for a 0-30 kV step
Dynamic Adjustment	Graduated 1-turn panel potentiometer is used to optimize the AC response for various load parameters.

*Measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter

Features (cont.)

High-Voltage On/Off	
Local	Individual push-button switches
Remote	TTL compatible input. TTL high (or open) turns off high-voltage output. TTL low turns on high-voltage output.
Current Limit/Trip	Switch selectable for limit or trip. Graduated 1-turn panel potentiometer is used to adjust limit or trip level from 0 to ±20 mA.
Out of Regulation Status Indicator and Connnector	Illuminates and TTL low is provided when unit fails to produce required HV output such as during current limit.
Limit/Trip Status Indicator and Connector	An indicator will illuminate and a BNC will provide a TTL low when the high-voltage output is disabled due to the output current exceeding the current trip level, the detection of a high-voltage supply fault, the removal of one of the panels, or if the Model 30/20A is out of regulation for greater than 500 ms.

Mechanical

Dimensions	103.9 cm H x 43 cm W x 87 cm D (40.9" H x 17" W x 34" D) Depth dimension includes wheels, handles and spacing for air flow.
Weight	73 kg (160 lb) approximate
HV Connector	Caton high-voltage Connector
BNC Connectors	Amplifier Input, Voltage Monitor, Current Monitor, Remote High Voltage ON/OFF, Out of Regulation Status, Fault/Trip Status

Operating Conditions

Temperature	0°C to 40°C (32°F to 104°F)
Relative Humidity	To 75%, noncondensing
Altitude	To 1524 meters (5000 ft.)

Electrical

Line Voltage	Factory set for one of two ranges: 104 to 127 V AC or 180 to 250 V AC at 48 to 63 Hz (specify when ordering)
Power Consumption	1800 VA, maximum
AC Line Receptacle	Standard 3-prong with integral fuse holder

Supplied Accessories

Operators Manual	PN: 23343
Shorting BNC Cap	PN: B3060
HV Output Cable	PN: 43466
Line Cord, Fuses	Selected per geographic destination
Locking Wheel Kit	CN: 1K042